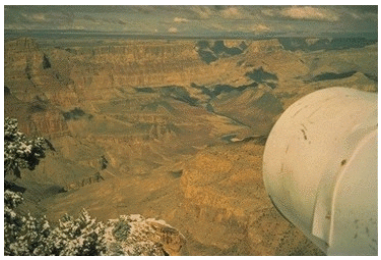
noaaresearch

Environmental Technology Laboratory

Using technology to look at our atmosphere and oceans



Doppler lidar over the Grand Canyon

X-band Doppler radar probes a North Dakota thunderstorm

915MHz wind profiler and RASS

Cloud Radar deployed to DOE's Southern Great Plains (SGP) site

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WhatWhat does the EnvWhat does the EnvirWhat does the Environme nation?

InIn medical science, there are many technologies for looking inside the human body.body. body. Most of us have visited the doctor for X-raysbody. Most of us have vis oror brokenor broken arm. An expectant motheror broken arm. An expectant mother ha atat several stages of development through the use of ultrasonic imaging. Almost everyevery athlete thes e daysevery athlete these days has an MRI at some point in their c severityseverity of their latest injury. These remote sensing methods provseverity of with a means for looking inside the human body in a noninvasive manner.

Similarly,Similarly, NOAA s EnvironmentalSimilarly, NOAA s Environmental Technology sensingsensing instrumentation that allow meteorologists and oceanographers to pee insideinside the earth s atmosphere and oceans.inside the earth s atmosphere and ocean cancan be used to see inside of severecan be used to see inside of severe storms, how andand count fish in the oceans, and how sound waves can be used to deand co tornados.tornados. ETL engineers and comptornados. ETL engineers and computer aacousticalacoustical systems conceived by the physicists and manage the data th systemssystems collect. ETLsystems collect. ETL meteorologists and oceanographers aroundaround the world to study a widearound the world to study a wide variety of atmosp

Recent Accomplishments:

- Super-cooledSuper-cooled water droplets within clouds can ofSuper-cooled water icingicing problems. ETL hasicing problems. ETL has developedicing problems. ET droplets.droplets. ***Payoffs: Deployed around airports,Payoffs: Deployed around ccouldcould could eventualcould eventually warn both outgoing and incoming icing conditions.***

- OneOne of NOAA s many rOne of NOAA s many respoOne of NOAA s many res nation snation s fish stocks. Ships arnation s fish stocks. Ships are usualln populationpopulation of fish schools. ETL has developed an airborne lapopulation augmentaugment ship-based fish surveys. This system is mountedaugment ship-b of a low flying aircraftof a low flying aircraft and is capable of measuringof a low flyi 4040 meters along40 meters along the flight line of the aircraft. It has been40 mete ininin recent flights over the Guin recent flights over the Gulf of Ain recent flig Portugal,Portugal, and is completely safe forPortugal, and is completely safe for all ***fish fish lidar can fish lidar can greatly extend and accelerate fish lidar surveys.***

- Pre-tornadicPre-tornadic stormsPre-tornadic storms oftenPre-tornadic storms often hashas developed sensorshas developed sensors capable of detecting infrasound. h shownshown thashown that an ishown that an infrasonic observatory comprising s capablecapable of detecting and locating the source of infrasound associated with severesevere weather. severe weather. ***Payoffs: Often infrasound emittedPayo cancan becan be detected before conventional weather radars can see th storms.storms. Infrasound technology may eventuallystorms. Infrasound severe-storm warning times.***

- ETL believes that a significant part of itsETL believes that a significant part of its fu general public gaining a more completegeneral public gaining a more complete und

ThatThat understanding begins with an appreciation of science and engineering at the grade school level thatthat develops throughout a student s academic cathat develops throughout a student s academic career. primaryprimary and secondary schools, universities and the media. ETL recently formeprimary and seconda SpelmanSpelman College, a Minority Serving Institution in Atlanta, GASpelman College, a Minority Serving In andand collegeand college students to environmental science and engineering. ***Payoffs:Payoffs: Through thi hopeshopes to interest hopes to interest a broader rahopes to interest a broader range of students in most promising of those individuals into ETL's workforce.***

What s next for ETL?

ETLETL isETL is working with a variety of agencies to better understand the atmospheric andETL is working with a var governgovern our weather and climate. One such effort focuses on severe Pacific storms tgovern our weather a alongalong the west coast of the United States. These stormsalong the west coast of the United States. These storm 19951995 and 1998. The specific1995 and 1998. The specific goal of1995 and 1998. The specific goal of this pro events. This effortevents. This effort hasevents. This effort has two primary components. The California Landfall usedused a combination ofused a combination of newobserving systems (aircraft, a network of wind profiler radars de andand satelliteand satellites) and satellites) to study the dynamics of these storms as they came ashore along duringduring the winter of 1997-1998. The Pacific Landfalling Jets Experimenduring the winter of 1997-1998. Th scheduledscheduled for early 2001, will develop and testscheduled for early 2001, will develop and test new instrume toto bestto best assimilate data to improve forecast accuracy,to best assimilate data toimprove forecast accuracy, and storms along the entire Pacific coast.

ETLETL also works with a number of agencies toETL also works with a number of agencies to develop new remote recentrecent effort, ETL scientists, in conjunction with NASA, arerecent effort, ETL scientists, in conjunction with NA aa remote controlled, solar powered aircraft. This aircrafa remote controlled, solar powered aircraft. This aircraft, ft,ft, higher than most weather events, is an ideal observationft, higher than most weather events, is an ideal ob potentialpotential applications of this technology. The system can be used to generate more detailed images of severesevere weather events, such as hurricanes, than are now available fromsevere weather events, such as hurric andand cost efficientand cost efficient means of evaluating the health of coral reefs. The systemand cost efficient r toto assess the moisture contentto assess the moisture content of the soil and vegetation, both of which are indicato susceptibility.

Research Partnerships:

ETLETL partners with a variety of local, federal and internatETL partners with a variety of local, federal corporaticorporations.corporations. Excorporations. Examples include the California Air Resources Board and th ConservationConservation Commission, NASA and the Department of Energy, the German Weather Service and CentreCentre National de la Recherche Scientifique (CNRS) in France, the UniCentre National de la Recherch University of L Aquila in Italy, Radian International of Austin, TX and Vaisala of Finland.

Budget and Staff:

ETLETL is an $18 million laboratory ($4.5 million of NOAA base), withETL is an $18 million laboratory ($4.5 mil employees, 28 contractors and 47 university staff.

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